The Northwestern MILLER
MILLING PRODUCTION SECTION

U.S. Has Surplus——— ———Needs More Quality

Excess, But Not Enough, Wheat

By Earl Cross
Vice President, Colorado Milling & Elevator Co.

SINCE shortly after World War I, many billions of dollars have been spent on attempted solutions to the wheat problem. Ten separate plans, or variations of plans, have been tried or fully explored. At one time or another, there have been the McNary-Haugen Plan, the Federal Farm Board, the AAA, rigid price supports, acreage allotments, marketing quotas, marketing agreements, the Brannan Plan and the soil bank.

None of these plans have brought about a solution.

In simple terms, there are two basic solutions to the wheat problem:

1. Reduce wheat production to match wheat demand and produce only quality wheat.

2. Continue to produce surpluses of wheat and find a market somewhere in the world for those surpluses, but produce only quality wheat.

The fact that no solution has as yet been found for this wheat problem has in turn created innumerable problems in connection with the production, storage, handling and milling of wheat into flour for conversion to bread. As we discuss these problems and look for an answer, it seems wise to deal in facts, not opinions. In the table you will find certain factual data relating to wheat. I suggest that we use this data as the basis of our joint consideration of this problem.

Supplies and Usage

The data in the table gives: First, wheat crop, carryover, imports, which combined give us total wheat supply; and, second, the usage of wheat for seed and industrial use, export, domestic food, feed and residual, which combined give us the total wheat disappearance.

Considering the crop year 1935-36, the wheat crop totaled 628 million bushels, the carryover from the previous year was 146 million bushels, and wheat imports totaled 35 million bushels, giving a total wheat supply of 809 million bushels.

The total wheat disappearance in that year was made up of 87 million bushels for seed and industrial use, 8 million bushels for export flour and wheat, 490 million bushels for domestic food, and 83 million bushels as feed and residual, giving a total disappearance of 668 million bushels, which left a carryover into the following year of 140 million bushels.

In direct contrast to these figures, we estimate that the year 1958-59 will work out approximately as follows: The 1958 crop is estimated as 1,447 million bushels, the carryover from 1957 was 846 million bushels, and imports 11 million bushels, giving a total wheat supply of 2,304 million bushels.

The estimated disappearance will be 65 million bushels seed and industrial use, 450 million export flour and wheat, 495 million domestic food, and 55 million feed and residual, making a total disappearance of 1,065 million bushels which, when deducted from the total supply of 2,304 million bushels, leaves an estimated carryover July 1, 1959, of 1,239 million bushels, or almost 10 times the carryover from the 1935 crop.

With the Agricultural Adjustment Act of 1933, this country's agricultural economy was committed to a policy embracing the principle of parity. Parity is a concept which (in theory) sees to it that the farmers of the nation receive a fair return for their commodities in relation to the cost of things they must buy.

In 1938, price support for certain farm products, including wheat, was set at 52% of parity. It was raised to 85% in 1941 and to 90% in 1942 (as a stimulus to food production needed by the U.S. and its allies during World War II and in the readjustment period at its close). The 1942 law specified that it should end two years after official termination of World War II or, in other words, on Dec. 1, 1948, if the law had been followed. In 1949, Congress passed a new law which set a new parity based on the most recent 10-year averages and decreed the supports should be lowered progressively, not more than 5% a year, until a level of 75% of parity was reached.

EDITOR'S NOTE: Mr. Cross originally presented this report at the recent Nebraska Wheat Show at Sidney.

However, Congress had hardly acted on this bill before it became frightened at its own boldness, thought better of its action, and substituted the old 90% of parity figure. This rate was continued through 1954. Then, the 83rd Congress established a range of 82½% to 90% for the 1955 crop, basis a transitional parity to comply with the modernized formula provided under the Agricultural Act of 1954. In 1955, under the transitional parity, the rate was 82½%; in 1956, it was 83.7%; in 1957, 82½%; and in 1958, it is 75%.

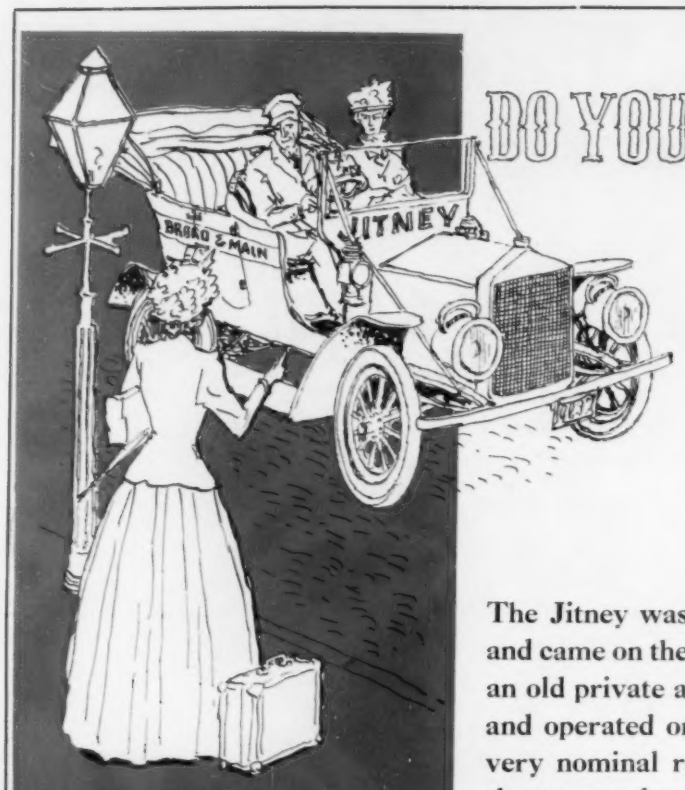
By law we have given the farmer incentive to produce all the wheat that he can produce, regardless of whether it be by use of fertilizers on his land, by irrigation, by planting

(Turn to **WHEAT**, page 9a)

25-Year Record of U.S. Wheat Supplies and Usage

	Total Wheat Supply (In millions of bushels)				Total Wheat Disappearance (In millions of bushels)				
Year Beginning July 1st	Total Wheat Crop	Carry Over From Previous Year	Wheat Imports	Total Wheat Supply	Seed and Industrial Use	Export** Flour & Wheat	Dom. Food	Feed and Residual	Total Disappearance
1935-36	628	146	35	809	87	8	490	83	668
1936-37	630	140	35	805	96	13	493	100	702
1937-38	874	83	1	958	93	107	489	115	805
1938-39	920	153		1073	74	111	496	142	823
1939-40	741	250		991	73	49	489	101	712
1940-41	815	280	4	1098	74	38	489	112	713
1941-42	942	385	4	1330	64	49	473	114	700
1942-43	969	631	1	1601	119	63	495	305	982
1943-44	844	619	136	1599	185	110	477	511	1283
1944-45	1060	317	42	1419	163	204	473	300	1140
1945-46	1108	279	2	1389	103	416	474	296	1289
1946-47	1152	100		1252	87	426	479	177	1169
1947-48	1359	84		1443	91	494	484	178	1247
1948-49	1295	196	2	1492	95	514	471	105	1185
1949-50	1098	308	2	1048	81	306	485	111	983
1950-51	1019	425	12	1456	87	380	480	109	1056
1951-52	988	400	32	1420	88	475	496	104	1164
1952-53	1306	256	22	1584	88	318	488	84	978
1953-54	1173	606	5	1784	69	217	487	78	851
1954-55	984	934	4	1922	65	274	486	60	886
1955-56	935	1036	10	1981	67	346	481	53	945
1956-57	997	1033	8	2038	59	535	483	60	1135
1957-58 *	947	903	5	1855	57	420	482	60	1019
1958-59 *	1447	846	11	2304	65	450	495	55	1065
1959-60 *		1239							
1960-61									

* Estimated ** Actual exports include the military supply program and civilian feeding in foreign countries.



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?

The Jitney was the forerunner of the motor bus and came on the scene about 1910. It was generally an old private auto fixed up to carry more people and operated on a fixed schedule and route at a very nominal rate, "jitney" at that time being a slang name for a five cent piece.

Overnight, jitneys swarmed through every city in the union competing with the street railways, but soon organized bus lines took over and the jitney was no more.

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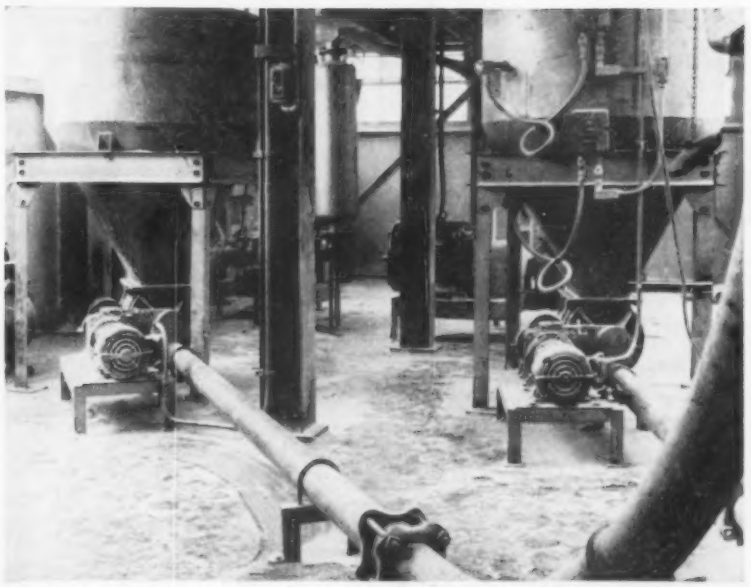
Pneumatic Handling Helps Solve Problem In Plant Expansion

This report deals with the success of the use of air conveying in a starch plant. It is printed here because of the application of air conveying to the milling industry.

By Calvin M. Ochs
Union Starch and Refining Co., Inc.



Reclaiming pneumatic conveyors transport starch to bagging machines at the rate of 20 tons/hr. Starch from large storage bins ascends by gravity to conveyor hoppers.

THE growing trend toward automatic materials handling systems is most evident in expansion programs when plant layouts are often revised. Occasionally, these alterations make existing materials handling procedures obsolete and costly, and plant engineers must then devise more efficient systems.

That's what happened when Union Starch & Refining Co., Inc., for which I am area maintenance supervisor, decided to double production at its Granite City, Ill., plant recently. One of the first problems to be solved was how to modernize an inefficient materials handling routine and reduce the handling costs.

At that time, dried pearl and powder starch from a 10,000 lb./hr. filtering and drying unit on the process building's third floor descended by gravity to a bagging machine at street level. The bags of starch were then loaded onto railroad box cars and transported over an indirect route to a warehouse located some 800 ft. away. Here, they were unloaded and palletized for later shipment.

If this handling system continued, it seemed certain that the planned addition of another 10,000-lb. filter and drier would mean twice as much handling and, consequently, higher handling costs.

We would have preferred to revamp our entire bagging and warehouse operations completely and consolidated these with the increased production facilities. This, however, wasn't possible because there was no unused space available to erect the necessary buildings. A cluster of small buildings and a railroad siding prevented this.

However, space was available elsewhere on the grounds, especially near the warehouse. The problem, though, was how to transport the starch from production to the warehouse site. Because of the distance (800 ft.) most forms of transportation were ruled out as being too expensive, of too little capacity, or too prone to sanitation problems.

These considerations prevented plant expansion until we investigated the possibilities of a pneumatic conveying system.

Problem Solved

Installation of an Airveyor system, engineered and supplied by the Fuller Co., Catasauqua, Pa., a subsidiary of the General American Transportation Corp., gave us the low cost, high volume transportation we needed and permitted us to go ahead with expansion plans.

Our new filtering and drying units were installed, as planned, on the third floor of the production building next to the existing units. Most of the bagging operation serving the older units was discontinued, and two high speed bagging machines were installed at the warehouse. Alongside this warehouse, a large building containing eight 50,000-lb. storage bins was built to receive starch from the driers. All of these operations are now connected by the system.

EDITOR'S NOTE: Mr. Ochs is area maintenance supervisor for his concern which is located at Granite City, Ill.

Arrangement — The system transports starch in two phases. One phase is arranged to transport it from the two driers to the eight storage bins. The second phase reclaims stored starch from these bins and transports it to receiving hoppers over the bagging machines. In addition, each phase has a separate conveyor for pearl and powder starch to prevent mixing of grades.

Conveying — Two pneumatic conveyors were installed on the second floor of the production building beneath the driers. These driers discharge by gravity into hoppers, and a screw conveyor at the bottom of the hopper delivers the product to a receiving Airveyor hopper. Starch is then conveyed through 5 in. lines to storage bins at a capacity of 10,000-lb./hr. in each line.

These lines go through an outside wall of the building and run horizontally along the wall to the opposite end of the building. Here, they are trussed over a rail siding and a busy street to a point on the roof of the warehouse. The lines follow the roof and then enter at a gentle curve near the bins at the top.

Reclaiming — Two pneumatic conveyors are located at the base of the eight storage bins supplied by the conveying phase. Four of these bins (handling pearl starch) empty by twin screw feeders into a screw conveyor, and four (handling powder) empty into another. These two conveyors deliver material to receiving hoppers, from which it is conveyed to the packing room at a capacity of 40,000-lb./hr. per system.

The reclaiming 4 in. lines are trussed from the bin building, across tracks and the warehouse, to the top of the packing building. These lines feed into the receiving hoppers of the bagging machines.

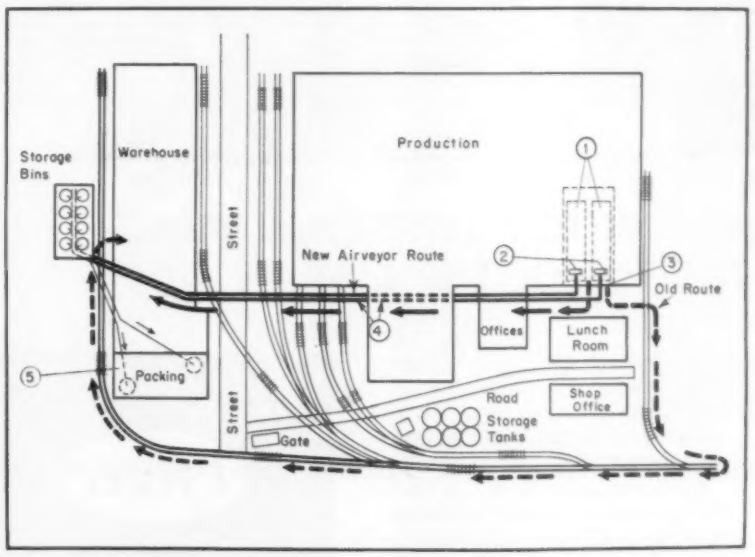


Diagram shows how pneumatic conveyor system solved expansion and handling problem. 1. Two 10,000 lb./hr. starch driers. 2. Two pneumatic conveyors pump dried starch to storage bins. 3. Starch was bagged here and taken over old route to storage. 4. New pneumatic conveying route is direct; passes through or over obstructions. 5. Pneumatic conveyors reclaim stored starch; deliver to packing bins.

Operation Is Automatic

The flow of starch is automatically controlled at the control panels located in the drier room and at the bagging machines.

In the drier room, an operator observes the condition of each storage bin by means of signal lights remotely actuated by Tektor high level indicators within the bins. When a bin is filled, a horn and light inform the operator and he cuts in an empty bin by means of a 5 in. two-way air-operated diverting gate installed at the top of each bin.

In the packing room, controls are provided at the panel to allow the operator to select any bin desired. Also, by means of a pipe switch, the operator is permitted complete flexibility in assigning either packer to any of the eight bins.

Other controls are provided at the panels for operation of components such as feeders, blowers, screw conveyors and filter-receivers.

How System Works

In pneumatic conveying system, materials are transported in an air stream in great volume and at high velocity. The necessary velocity in the system is created by a positive pressure blower pumping through a motor-driven airlock feeder. The airlock feeder delivers a volumetrically controlled amount of starch from a receiving hopper into the air stream at each rotation. Blowback of air is minimized due to the close clearances between the feeder vanes and the case.

One of the features of the system is its ease of installation. Conveying lines can be run anywhere. At Union Starch we've put them through walls, along sides of buildings, over streets, on roofs, and up inclines. The total distance covered is 800 ft. with a number of 45° and 90° bends in the line.

Benefits Listed

Pneumatic conveying has opened the way to expansion for us at economical cost, and provided us with a starch handling system that has numerous advantages.

Reduced Handling—We have eliminated the triple handling that was

necessary when we used box cars to deliver to warehouses for storage. Now, the product stored is handled only twice—when it is bagged and when it is shipped.

Much More Storage — Our eight 50,000-lb. storage bins give us an ample amount of product to maintain packing schedules at peak efficiency and to meet shipments.

Automatic Remote Control — The remote control panels provide fully automatic control over quantities and types of starch and deliver these in the quantities and times when needed. Bins are filled automatically and as required.

Automated Storage and Packing— Starch is conveyed automatically to wherever needed. Bulk transfer of starch reduces messy bag handling and rehandling.

Sanitation — The system is self-cleaning. No residue is left in any part of the system to contaminate another grade of starch. Lines are dust and water tight. In all kinds of weather, starch conveyed in pipe at 110° F. showed no signs of condensation and only a negligible drop in moisture content. Actually, the product is not in the pipes long enough to react.

Flexible Installation — Pneumatic conveying permitted us to build our new facilities where we wanted to build them. This provided the greatest convenience and maximum utility.

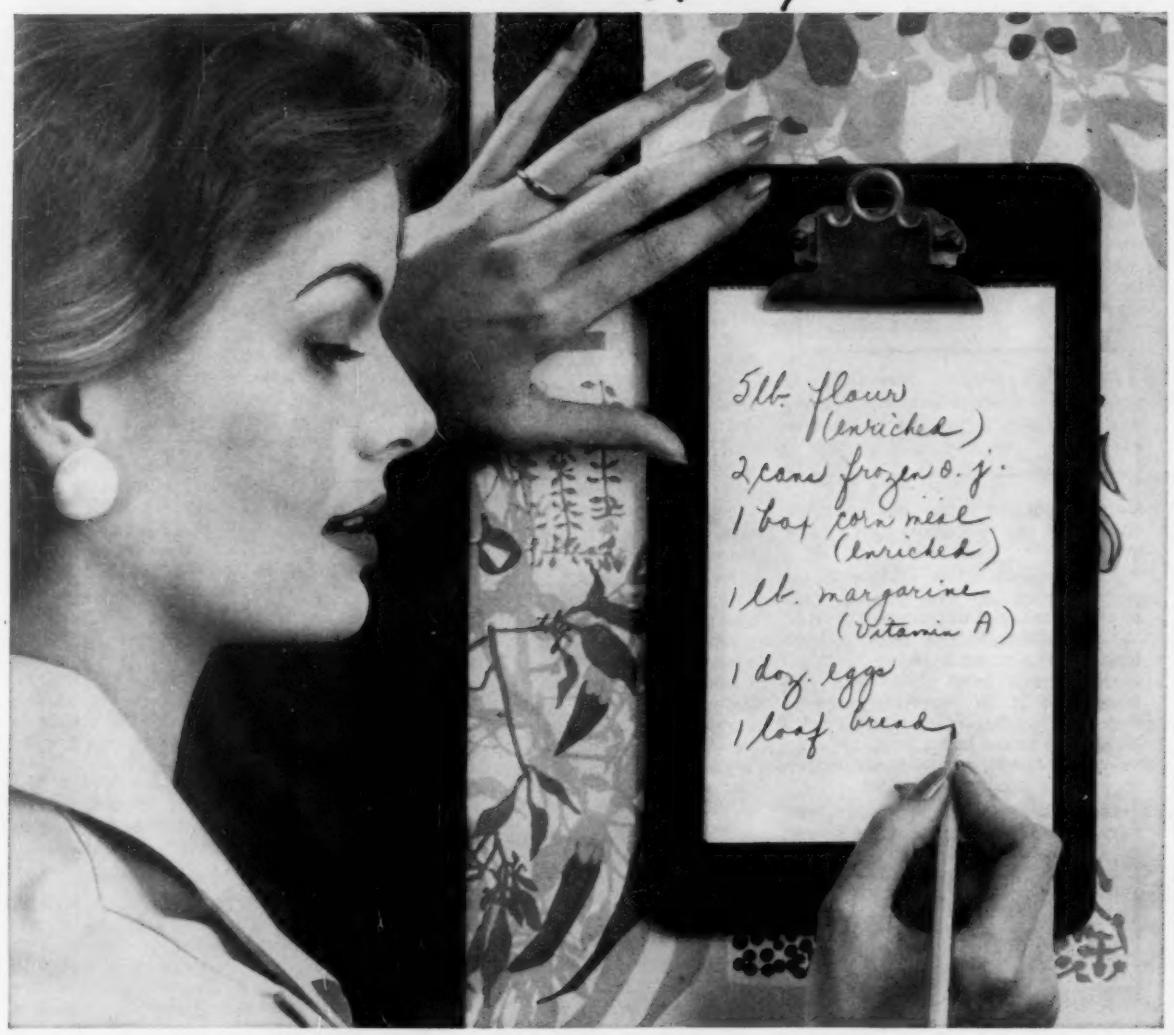
Low Maintenance—We took a section of pneumatic pipe apart after considerable use. Inspection showed no signs of wear and the galvanized inner surfaces were bright and shiny.

——BREAD IS THE STAFF OF LIFE——

ELEVATOR CONSTRUCTION

ARKANSAS CITY, KANSAS — Plans for the construction of a 250,000 bu. concrete elevator in the Arkansas City area have been announced by the Two Rivers Consumers Cooperative.

A Peek at today's shopping list shows...



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Peavey Announces Moisture Computer Development

Introduction of a new electronic computer for measuring moisture content in grain and other products has been announced by officials of F. H. Peavey & Co., Minneapolis, grain and milling firm.

R. W. Kemerer, vice president of Peavey, said the company has completed research and development of the computer and is going into production with a quantity of the units for use in its own elevators and laboratories. Production will also be expanded to meet whatever demand develops throughout the rest of the trade.

"The machine," said Mr. Kemerer, "initiates a new era in moisture measurement by overcoming the combined inadequacies of present measuring methods. It is speedy and simple to use, gives direct-instantaneous readings, tests all grains, doesn't destroy the sample being tested, is portable and positively accurate."

According to Mr. Kemerer, the computer operates on a totally new physical principle previously not used in moisture measurement. However, he would not disclose the physical process by which Peavey can guarantee absolutely accurate computations of moisture content. But, he did state that Peavey utilizes a universal standard that assures constant calibration of its new computer.

"This," Mr. Kemerer said, "eliminates transporting the machine to state or federal weights and measures office for periodic recalibration. As long as the machine is running it is bound to provide a completely accurate reading."

Development of the computer in the Peavey firm has been in the hands of Lowell Moe, director of electronic research, assisted by Orval Egstad, research engineer, and Oscar Olson, grain laboratory superintendent. Mr. Kemerer said it is the company's intention to market the computer at a price competitive with other top-rated moisture devices.

——BREAD IS THE STAFF OF LIFE——

K-State Receives Research Contracts

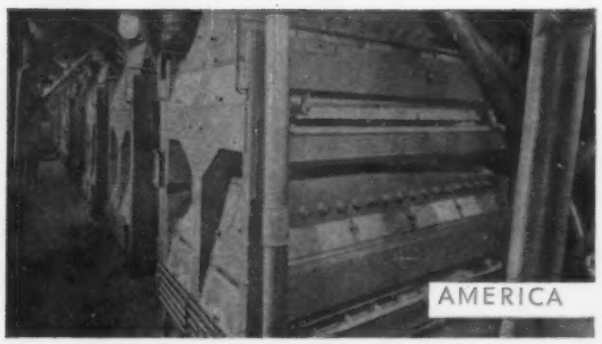
The Kansas State College department of flour and feed milling industries has three new research contracts with support totalling $48,160.

One, with the Agricultural Research Service of the U.S. Department of Agriculture, involves the study of chemical treatment of wheat during malting to regulate enzyme productions and malting losses. The contract, for $28,600, is to be active for 30 months. John A. Johnson and James Fleming are supervising the research.

Under a $14,560 contract with the Army Quartermaster Research and Engineering Command, the department will continue research on production of bread with non-staling characteristics. The work will be directed by Mr. Johnson and Donald Miller.

The third contract, for $5,000 annually, involves research on methods and factors affecting starch gelatinization. John Sullivan is a research fellow on the project and will be working with Mr. Johnson. This research is sponsored by the Quaker Oats Co.

MIAG ALL-METAL PURIFIERS throughout the world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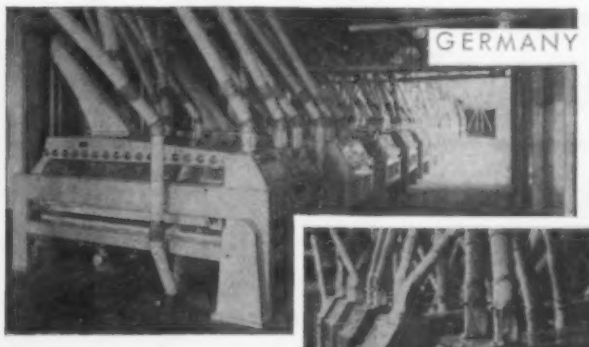
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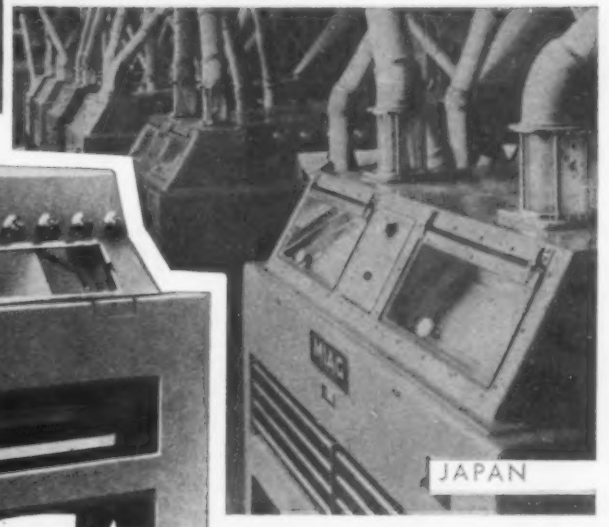
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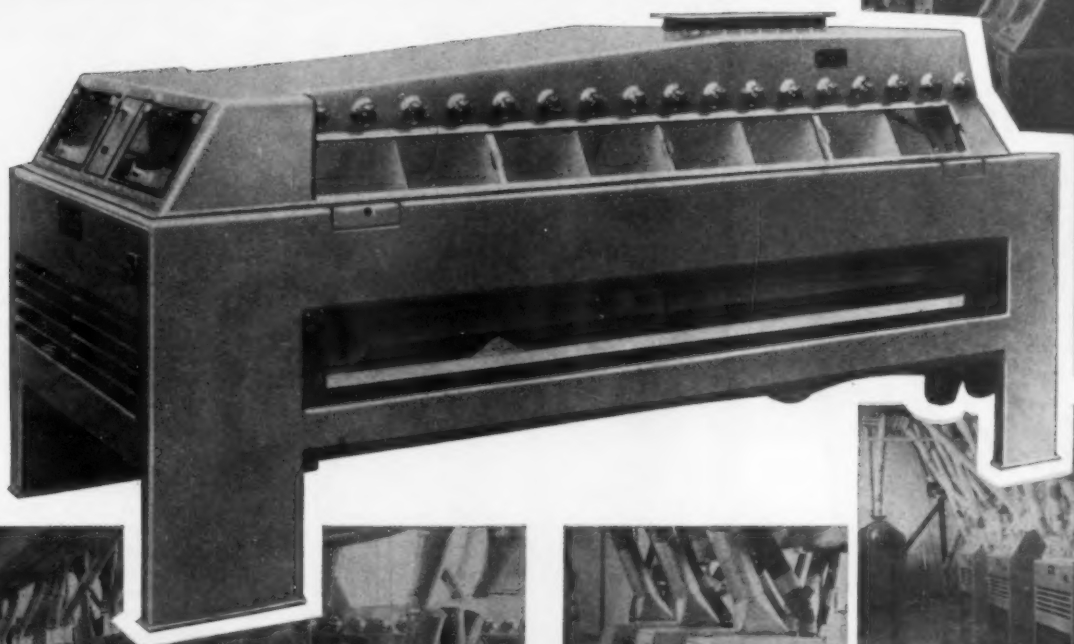

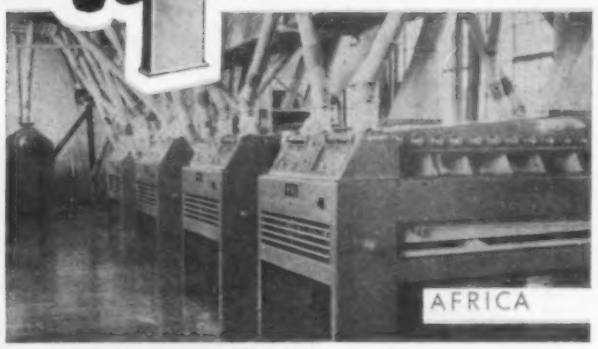
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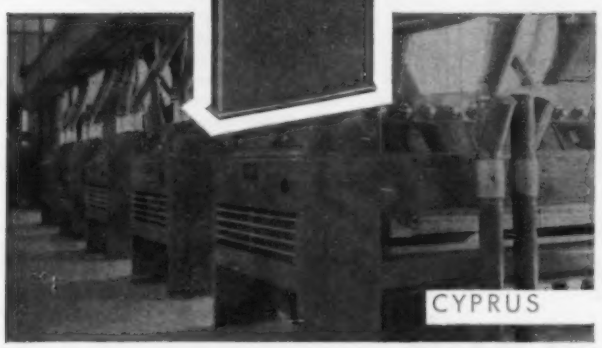
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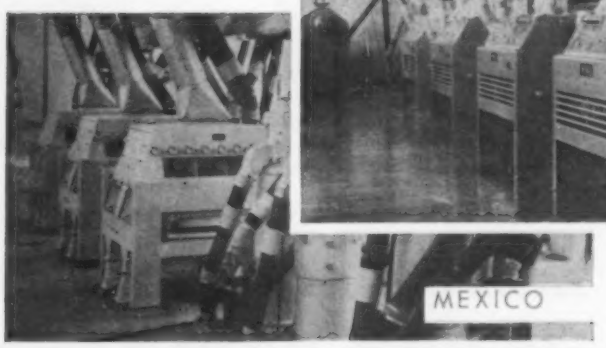
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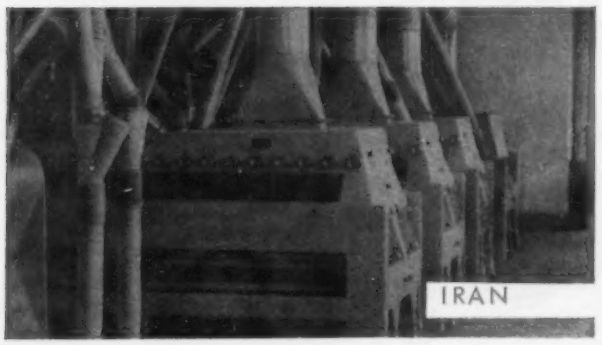
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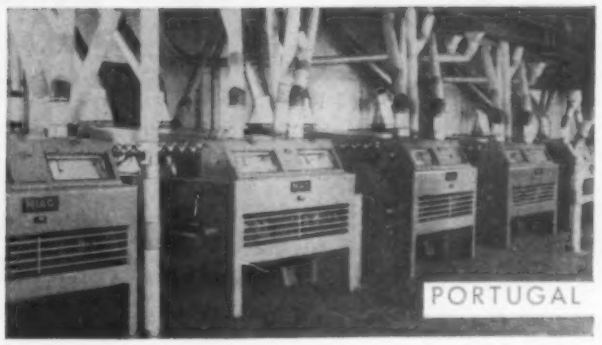
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BRAUNSCHWEIG (Western Germany)

Trade Viewpoint on Soft Wheat Quality

By Roy K. Durham

The Pillsbury Co.

MOST of the soft wheat flour milled today finds its way into biscuits, cookies, cakes or crackers. It is too much to expect that any one wheat variety will yield flour that is ideally suited for all flour uses. Generally speaking, however, the predominant soft red winter wheat varieties grown in the Midwest are satisfactory from a milling and baking point of view.

There are, however, variations from one crop year to another which sometimes result in unsatisfactory baking performance. The current crop, because of predominance of sprouted kernels, is an example. The 1957 and 1956 harvested crops of soft red winter wheat were less desirable for cake baking purposes than the 1955 crop. It is my understanding that there was no significant shift in acreage seeded to wheat varieties during that period.

Soft wheat breeders should not be misled by those in the milling or baking industries who demand new varieties simply because any current year's crop possesses some relatively undesirable characteristics. What is needed more than new varieties in such a year is greater fundamental knowledge to explain why flour from that year's crop performed differently.

Roy K. Durham

Mr. Durham is technical manager of the flour quality control department of the Pillsbury Co., Minneapolis. He originally presented this report at the Eastern Soft Wheat Conference at the Ohio Agricultural Experiment Station at Wooster recently.

Progress Satisfactory

I am pleased to report that the Soft Wheat Quality Laboratory at Wooster is making satisfactory progress toward supplying that fundamental knowledge.

Hereinafter, I may use the expressions "softer characteristics" or "harder characteristics." Before proceeding, I shall explain what I mean by those expressions. My explanation will be related to certain tests now in use at the Wooster Soft Wheat Quality Laboratory.

The pearling test is one measure of what I refer to as softness. The greater the pearling index, the softer the wheat kernel texture.

Particle size index as determined in the Wooster laboratory is another good measure of wheat softness. Later in my talk, I shall discuss particle size from a different viewpoint.

Amount of break flour released during the Allis-Chalmers experimental milling test also indicates degree of wheat kernel softness.

Of the baking tests employed, the

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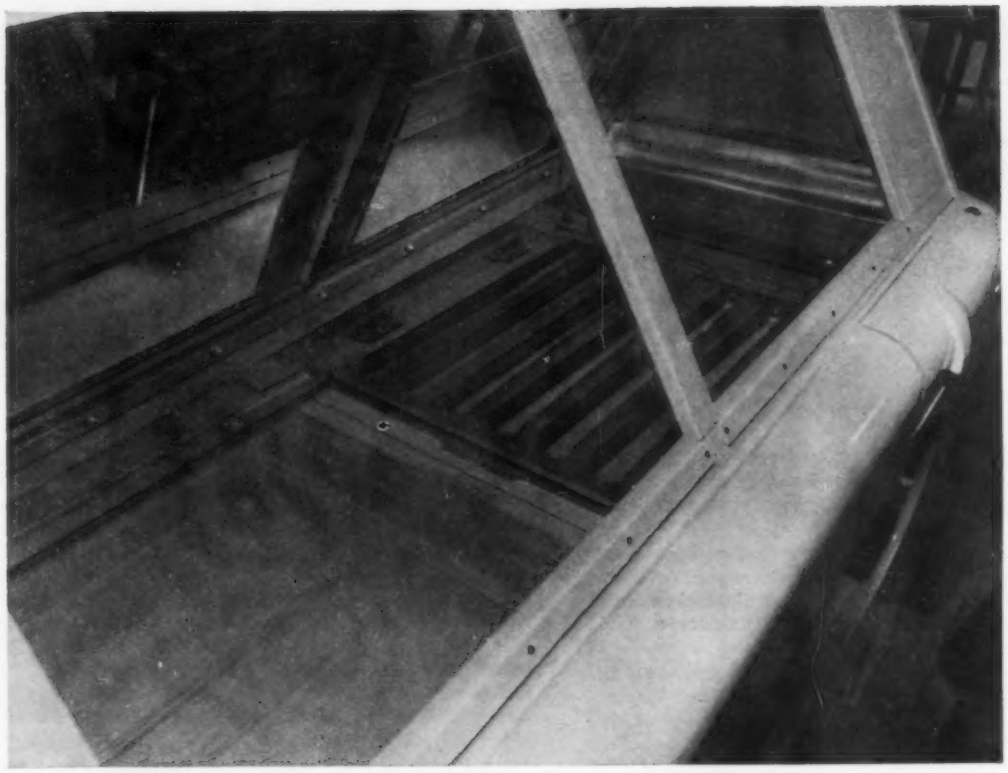
Why a tail sheet aspiration grid means better purification of stocks



When stock passing down a purifier sieve reaches the tail sheet the quantity is normally insufficient to cover the sieve and thus ensure an even distribution of the air passing through. Since the air always takes the easiest course it will pass through the bare patches on the cover and avoid the stock.

The result is either the overtailing of good stock, the contamination of throughs with branny matter, or a combination of both.

The scientifically-designed tail sheet aspiration grid fitted to the Robinson purifier concentrates the stock on the tail sheet into narrow tapering channels which ensure that the air passing through the sieve can do its work efficiently. The result—really efficient separation and classification.

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- Vibratory hoppers eliminate worms and driving mechanism.
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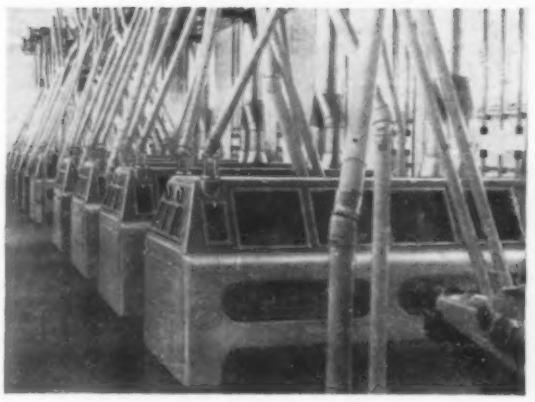

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cookie test is a good indication of softness or hardness. The alkaline water retention capacity of flour, which Dr. Yamasaki has shown to be related to cookie spread, likewise indicates degree of softness.

Protein content has ceased to be a reliable measure of softness.

At this point you will understand what is meant when I say it will please the milling and baking industries if the soft wheat breeder will incline toward softer characteristics when in doubt. It is very probable that in the foreseeable future there will be ample harder type soft wheat grown so that the miller can make wheat blends to yield harder type flour if he so desires.

Characteristics Discussed

The cookie baker who is seeking maximum cookie spread prefers flour possessing very soft characteristics. In this connection it should be mentioned that soft white wheat flour produces cookies with generally greater spread than does soft red winter wheat flour. The baker of spread type cookies is, therefore, not dependent upon soft red winter wheat flour.

The cracker baker prefers a flour that is as hard as the hardest soft wheat flour and preferably somewhat harder. It is quite common to blend some low protein hard wheat with soft red or soft white wheat to produce cracker flour.

Flour preference for use in chemically leavened biscuits is an indeterminate thing. Satisfactory biscuits are made from a wide variety of flour types—even hard red winter wheat flour. The wheat breeder need, therefore, give little or no thought to biscuit baking performance.

This brings us to consideration of the fourth and, from standpoint of size of market, the most important soft wheat flour use, namely, cake baking. For most satisfactory cake baking performance, the flour should be milled from wheat that is intermediate on the softness scale between that which is best suited for spread type cookies and that which is preferred by the cracker bakers.

If one keeps in mind the rather wide range of softness required to satisfy the spread type cookie baker and the cracker baker as well as the intermediate softness preferred by the cake baker, it seems to me to be unreasonable to expect the wheat breeder to develop a soft wheat variety that will satisfy all three bakers. And so I come back to my opening statement that, generally speaking, the predominant soft red winter wheat varieties grown in the Midwest are satisfactory from a milling and baking point of view.

Turbo Milling

A novel milling process has recently been developed that will somewhat lessen the pressure on the soft wheat breeder. He may now devote a little less attention to milling and baking characteristics of varieties. I refer to the Turbo-Milling process.

This new process involves the reprocessing of conventionally milled flour. Two steps are involved—(1) average particle size of the flour is reduced and (2) the flour particles are classified into fractions according to size, shape and density. Particle size reduction is accomplished essentially by attrition. By this method of disintegration, starch granules are not damaged as they would be by shearing action if reground in a roller mill.

Conventionally milled flour is a heterogeneous mixture of particles varying in size from approximately 1 micron to 150 microns. It is not practical to further subdivide this flour by normal sifting methods. But by using air-classifiers, it is possible to fractionate conventionally milled flour into several component parts, each part being made up of particles falling within a narrow size range. For example, 0 to 10 microns, 10 to 20 microns, 20 to 30 microns, etc. Air-classified particles larger than, approximately, 50 microns are often referred to as endosperm chunks. They are tiny chunks composed of protein and starch and some lesser constituents cemented together in the same proportions as they exist in the natural wheat kernel. There appears to be no good reason to further classify them into more particle size fractions because they are all similar to the parent flour in protein and starch content as well as baking performance.

During normal wheat-to-flour milling process some of the endosperm disintegrates into particles of almost pure protein and pure starch. The protein particles range from approximately 0 to 15 microns in size. Starch granules fall into approximate range of 15 to 30 microns. The turbo miller is able to separate from normal soft wheat flour containing 8% protein a commercially practical percentage of very small particles that analyze 20 to 25% protein (N x 5.7). This fraction is now on the market. It is used to fortify bread flour where added baking strength is needed. It is also used in specialty high protein breads. By resorting to reclassification it is possible to increase the protein concentration to 35 or 40%, but it is not practical. The remainder of this smallest size fraction consists of tiny starch granules, chips from larger starch granules, fat, fiber and lesser, not identified, material.

The next larger particle size cut is composed, chiefly, of relatively small starch granules. From turbo-milled soft wheat flour this fraction will contain approximately 5 to 6% protein. It is an excellent angel food cake flour, performs very well in

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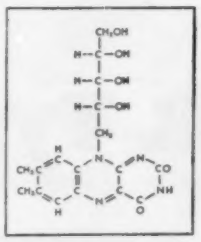
INSIDE SCIENCE

The Vital Story

A Quick History. Independent investigators, working separately to unlock several of nature's doors, sometimes open up unsuspected relationships. This happened with vitamin B_2.

Investigations. About 25 years ago, several groups, notably Warburg's, were investigating a "yellow enzyme" obtained from yeast. Almost simultaneously other investigators were studying a food factor that aided growth of laboratory animals.

What they found. Proceeding with chemical analysis of this growth factor, the team of Kuhn, György, and Wagner-Jauregg noted a relationship between the growth-producing agent and the "yellow enzyme." Their findings, and those of other researchers along similar lines, were published in 1933. Eventually, riboflavin and an essential part of the yellow enzyme were found to be identical and the unity of an essential nutrient and cellular metabolism was established.



Isolation of pure riboflavin was achieved by Kuhn and his co-workers, and by Ellinger and Koschara, in 1933.

Nomenclature. Known in the United States as riboflavin, this vitamin has also been called lactoflavin, ovoflavin, hepatoflavin, and vitamin G.

SYNTHESIS

By 1935, two eminent chemists, working separately, had synthesized riboflavin, practically in a dead heat. Prof. Paul Karrer of the University of Zurich, a collaborator of the Hoffmann-La Roche Laboratories, produced the first successful synthesis. Five weeks later Richard Kuhn of Germany announced his synthesis of the vitamin. Prof. Karrer subsequently shared the Nobel Prize in Chemistry for his work in vitamins and carotenoids.

The Karrer synthesis forms the basis for chemical processes in widespread use today by Hoffmann-La Roche and other leading manufacturers throughout the world. Riboflavin is also manufactured today by fermentation methods.

CHEMICAL AND PHYSICAL PROPERTIES

Riboflavin is yellow, slightly water-soluble with a greenish fluorescence and a bitter taste. Its empirical formula is $C_{17}H_{20}N_4O_6$. Vitamin B_2 produced by the Roche process is identical in every way with that occurring in nature.

How does vitamin B_2 work? Riboflavin is a vital part of nature's chain of reactions for utilization of carbohydrate energy. It has been found to be a constituent of many enzyme systems and is thus intimately connected with life processes. It is probably required by the metabolic processes of every animal and bird as well as by many fishes, insects and lower forms of life. (In certain animals, however, the requirement may be synthesized by bacteria within the intestine.)

In the cells riboflavin goes to work attached to a phosphate group. This substance, known as riboflavin-5′-phosphate or flavin mononucleotide, may in turn be attached to still another essential substance, adenylic acid, forming flavin adenine dinucleotide. Either nucleotide then is attached to protein, thereby forming an enzyme, and takes its part in oxidation-reduction reactions.

Requirements in Human Nutrition. As we have seen, vitamin B_2 is essential to life. We have no special storage organs in our bodies for this vitamin, although a certain level is maintained in various tissues, with relatively large amounts found in the liver and kidneys.

MEASURING METHODS

In the beginning, riboflavin activity was described in "Bourquin-Sherman units" and requirements were thought to be very small. Subsequent research showed otherwise. Milligrams of weight became the unit and the Food & Drug Administration of the U. S. Dept. of Health, Education & Welfare established (July 1, 1958) a minimum daily requirement of 1.2 mg. of riboflavin for all persons 12 or more years old. For infants it is 0.6 mg. These requirements are designed to prevent the occurrence of symptoms of riboflavin deficiency disease. The minimum daily requirement for this vitamin for children from 1 to 12 years is 0.9 milligram.

Recommended allowances. The Food & Nutrition Board of the National Academy of Sciences—National Research Council, in its 1958 publication #589, recommends the following daily dietary allowances of riboflavin, expressed as milligrams. These are designed to maintain good nutrition of healthy persons in the U.S.A.

Men	1.8		
Women	1.5		
Women (pregnant; second half)	2.0		
Women (lactating)	2.5		
Infants (2 to 6 months)	0.5		
Infants (7 to 12 months)	0.8		
Children (1 to 3 years)	1.0		
Children (4 to 6 years)	1.3		
Children (7 to 9 years)	1.5		
Children (10 to 12 years)	1.8		
		Boys	Girls
Adolescents (13 to 15 years)		2.1	2.0
Adolescents (16 to 19 years)		2.5	1.9

high ratio cake formulas and in cookie doughs. By further reprocessing this fraction, it is possible to obtain a cut containing only 2 to 3% protein.

Step Further

Going a step further up the scale, the next larger particle size cut contains large starch granules mixed with considerable small endosperm chunk material. If soft wheat flour has been the parent stock, this fraction will contain about 7% protein and is a satisfactory flour for use in high ratio cake formulas.

It is obvious from the foregoing that the turbo miller can make several critical cuts or combinations of fractions to yield types of flour best suited for specific purposes. Furthermore, he is not nearly so dependent upon Mother Nature as he formerly was. He can remove more or less protein. He can remove more or less starch. He can modify baking performance within limits by further particle size reduction in the turbo system.

The hard wheat turbo miller is now deriving from hard red winter wheat a starchy fraction containing approximately 6 to 7% protein. It is being sold to commercial cake bakers to take the place of soft wheat cake flours. This fraction performs very well in high ratio layer cakes, in loaf cakes and in angel food cakes. Although the cakes are not quite as tender as those made from soft wheat flour, they will stand the rougher handling to which bakery cakes are subjected. And, in addition, the cakes have whiter crumb color and larger volume than those made from soft wheat flour. Because of greater liquid carrying capacity, the yield of baked products is greater.

Other things such as test weight per bushel and baking performance being equal, the turbo miller prefers wheat kernels that are relatively less vitreous. The endosperm of such kernels more readily disintegrates into pure protein and pure starch particles during normal milling. The turbo miller can, however, mellow the most vitreous kernels ahead of the milling process, although this may sometimes require unusual tempering or conditioning steps. The wheat breeder should, therefore, not be concerned with kernel hardness insofar as this property affects milling performance.

It is with considerable hesitancy that I am telling you about turbo milling. The milling and baking industries do not choose to give the wheat breeder and agronomist cause to feel that inherent milling and baking properties of wheat varieties are no longer important. The turbo miller can upgrade baking performance. Nevertheless, he much prefers to start with the best possible raw material.

WHEAT

(Continued from page 1a)

undesirable varieties that produce more bushels to the acre, or by any other method which complies with the farm program. As indication of the degree of incentive that has been placed before the farmer to produce wheat, we only have to look at the wheat loan rates. When the farm price support program became law in 1938, the loan rate on No. 1 Hard Winter Wheat, basis Kansas City, was 72¢ bu., and this same loan rate in 1954 was $2.54 bu. Dark Northern Spring Wheat carried a loan rate in 1938 of 81¢ and in 1954 of $2.57. The national average price support rate was 60¢ in 1938 and $2.24 in 1954. These loan rates were based on 52% of parity in 1938 and 90% of parity in 1954.

Success of Program

It is obvious that the government loan program has been a great success, if success is to be measured by production far in excess of our needs and government ownership of huge, unmanageable surpluses turned over to it through the loan program.

In 1951, farmers turned 19% of their total wheat crop over to the government under loan; in 1952, 22%; in 1953, 36%; in 1954, 50%. This continued until in July, 1956, the government owned outright approximately 1 billion bushels wheat.

Taking ownership of this wheat under the loan program, storing it, and then trying to dump it in world markets has been a stupendous undertaking and has cost you, the taxpayer, billions of dollars.

One rigid support critic says, "As the support situation proves, rigid price support levels misdirect the use of agricultural resources by maintaining an excess of output, prohibiting the proper flow of commodities into consumption, attracting additional imports of goods in surplus, and pricing American products out of the world market."

The secretary of agriculture has referred constantly to the evils of producing for storage under government instead of consumption. He has also stated that our farm economy, or for that matter, our national economy, cannot remain sound and healthy if we are to continue paying taxes to provide funds to produce wheat, for which there is no economic need, and then pay more taxes to enable the government to store and then dump this wheat in foreign countries at far less than they paid the farmer for it.

(At this point I want to make it very clear that I am in no sense being critical of the wheat farmer. He is and has been doing just what the

# of VITAMIN B_2 *by* Science Writer

(Riboflavin)

Deficiencies of vitamin B_2 appear in several ways in human beings. The eyes, the skin, the nerves, and the blood show the effects of too little riboflavin. Laboratory animals have demonstrated that a riboflavin-deficient diet can cause death of adults and can slow or stop growth in the young. Female animals, deprived of riboflavin in the diet, may produce offspring with congenital malformations.

Medical uses. To overcome and control deficiencies in human beings, physicians have pure riboflavin available for administration by injection or orally, by itself or with other "B" vitamins or multi-vitamin-mineral combinations.

How do we get our daily riboflavin? Vitamin B_2 has wide distribution throughout the entire animal and vegetable kingdoms. Good sources are milk and its products, eggs, meats, legumes, green leaves and buds. Whole-grain cereals have significant but not large amounts of riboflavin.

ADDITION TO FOODS

Cereal foods play a large part in our diet. To produce the white flour almost all of us want, millers are obliged to remove parts of the wheat that contain much of the grain's riboflavin and other nutrients. In addition, cereal grains are not rich sources of riboflavin. Millers meet this problem by *enriching* the grain foods for which federal standards exist with vitamins B_1, B_2, niacin and the mineral iron. In the case of vitamin B_2, however, they do more than *restore* the processed food to its natural riboflavin level; they *fortify* the food with enough of this essential vitamin to make it nutritionally more valuable than it was in nature.

Acting to protect the good health of millions of Americans, bakers and millers adopted *enrichment* of white bread and white flour in 1941. Since that time, other foods, such as macaroni products, corn meal and grits, farina, pastina and breakfast cereals have had their food value increased by enrichment with pure riboflavin and other vitamins and minerals.

When enriching, fortifying or restoring, food manufacturers add the necessary quantity of riboflavin (and other vitamins and minerals) to the food during processing, so that the finished product meets federal, state, and territorial requirements or contributes to the consumer an amount of the vitamin that dietary experts believe significantly useful.

PRODUCTION

Prof. Karrer's synthesis of riboflavin was a laboratory success. Adapting the process to commercial production, however, demanded original thinking by chemists at Hoffmann-La Roche. The production of riboflavin by chemical synthesis requires the production of ribose, a rare sugar, at an early stage in the process. This special sugar must be made inexpensively if the synthesis is to be practical. Sugar chemistry is a difficult matter. In a brilliant piece of work, the Roche chemical experts developed a method to produce ribose on a commercial scale by an electrolytic process, thus overcoming a most troublesome problem. Subsequently, Roche chemists developed the first practical synthesis for riboflavin-5′-phosphate, identical with natural flavin mononucleotide.

Picture three streams joining to form a river and you have a simplified idea of the Roche process for synthesizing vitamin B_2. O-xylene and glucose are processed separately to form xylidine and ribose respectively. These are joined to form ribitylxylidine, which is then converted to ribitylaminoxylidine. Starting separately with malonic ester, which is processed through intermediate stages to alloxan, the third "stream" is then joined with ribitylaminoxylidine to form riboflavin. Purification occurs at each step of the synthesis. Riboflavin Roche* equals or exceeds U. S. P. standards.

By the tons. So efficient is the Roche process that pure riboflavin is produced *by the tons* for use in pharmaceutical products and processed foods. An interesting development by Roche is the production of riboflavin in different forms related to the method of end use. Roche* Regular riboflavin U. S. P. is especially useful in dry enrichment premixes, powdered dietary supplements, pharmaceutical tablets and soft gelatin capsules. Roche* Solutions type is preferred for the manufacture of solutions having low concentration. Roche* Riboflavin-5′-Phosphate Sodium is a highly and rapidly soluble riboflavin compound favored for all pharmaceutical liquid products and some tablets, lozenges, and capsules. It has a more pleasant taste than the bitter U. S. P. riboflavin.

This article is published in the interests of pharmaceutical manufacturers, and of food processors who make their good foods better using pure riboflavin Roche. *Reprints of this and others in the series will be supplied on request without charge. Also available without cost is a brochure describing the enrichment or fortification of cereal grain products with essential vitamins and minerals. These articles and the brochure have been found most helpful as sources of accurate information in brief form. Teachers especially find them useful in education. Regardless of your occupation, feel free to write for them. Vitamin Division, Hoffmann-La Roche Inc., Nutley 10, New Jersey. In Canada: Hoffmann-La Roche Ltd., 1956 Bourdon St., St. Laurent, P. Q.

law permits and what most of us would probably do if we were in his position.)

Quality Picture

To get a clear picture of the quality problem, let's use wheat production in Kansas during the last 33 years. During the period 1924 to 1934 (prior to the loan program), Kansas farmers planted 8% of their acreage to poor varieties, 25% to medium gluten varieties, and 69% to strong gluten varieties.

The basic price support program, including acreage allotments, became effective in 1938. It gave the farmer a guaranteed price for his wheat, as wheat, regardless of its variety or its desirability as milling wheat for producing commercial bread. In 1939, the year after the loan program began, Kansas farmers planted 15.8% of their wheat acreage in poor varieties, 31% in medium gluten varieties, and 53.2% in strong gluten varieties. In 1954, after 12 years of the loan program had elapsed, Kansas farmers planted 13.1% of their acreage to poor varieties, 70.2% to medium gluten varieties, and 16.7% to strong gluten varieties.

During this period of time, the Kansas wheat farmer literally lost his domestic market for wheat by planting the wrong varieties of wheat. He did this since certain undesirable varieties and certain medium gluten varieties gave him greater yields per acre or matured earlier or were less susceptible to various diseases or for other reasons and he knew that regardless of what he planted, the government would take the wheat from him under the loan program at a guaranteed price.

In 1954, the Kansas Wheat Improvement Assn., together with other interested parties, appealed to the U.S. Department of Agriculture for the establishment of loan discounts on undesirable varieties. In 1955, the secretary of agriculture announced a discount of 20¢ under the base loan on certain varieties of wheat, and today this discount includes the following list of winter wheat varieties: Bluejacket, Chiefkan, Cimarron, Early Blackhull, Kanking, New Chief, Red Hull, Redjacket, Stafford, Kanqueen, Kawvale, Nured, and Seabreeze. Certain spring wheat varieties are also included.

The establishment of discounts under the loan for certain undesirable varieties was the first constructive step taken by USDA in bringing about a correction of the quality problem.

What Is Quality?

Wheat quality, as it relates to flour for commercial production of bread (by far the largest use of wheat) is determined by gluten quality.

Admittedly, man's principal contribution to wheat quality is developing varieties which under normal conditions produce stronger gluten flours. New wheat varieties can be successful, however, when soil conditions and environment permit that wheat to mature under proper conditions. The decline in soil fertility and conditions of moisture and heat, under which a crop matures, can reduce the gluten strength of even the strongest gluten variety of wheat. The consistent production of strong, good quality, high protein wheat is dependent upon the proper balance of the influences of environment, va-

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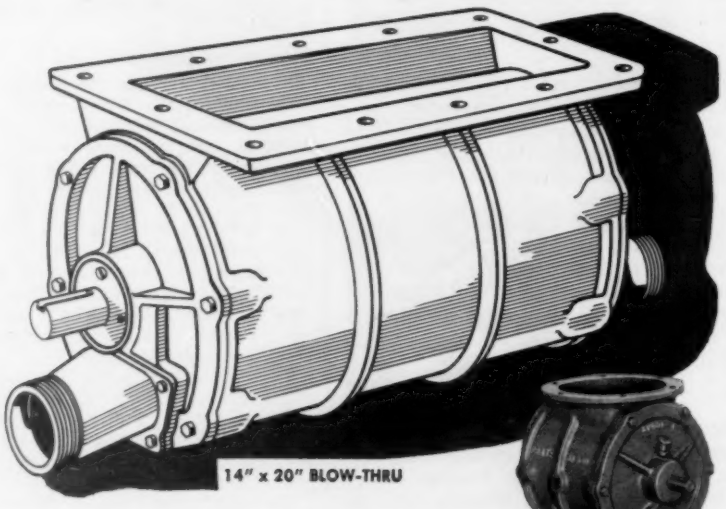

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riety and soil. Man's efforts in the area of variety have been very successful and to some extent he can very definitely improve the soil, but environment at this point is something over which he has no control.

In the area of varieties, Nebraska has been outstandingly successful. According to the report issued by the Nebraska Grain Improvement Assn., 68% of Nebraska acreage was planted to strong gluten varieties in 1957 and 64% in 1958. The two basic strong gluten varieties have been Cheyenne and Nebred. The wheat producers in Nebraska and every one else who has had anything to do with the planting of strong gluten varieties are to be congratulated. I know of no wheat producing state where greater success in the planting of strong gluten varieties has been achieved.

Here again, however, we must all recognize that during a given year soil and environment can materially reduce the quality of your basic strong gluten varieties, Cheyenne and Nebred, which means that we must be prepared to recognize that the production of strong gluten wheat may run in cycles, even though the same basic varieties are planted each year.

Poor Gluten Quality

On July 1, this year, the total carryover of wheat was 846 million bushels. A very high percent of this total was owned outright by the government and also a very high percent of this total was poor gluten quality in terms of conversion to flour for use by commercial bakeries.

Much of the 1958 wheat crop just harvested was not strong gluten types of wheat and today millers are finding it difficult to secure all of the strong gluten varieties of wheat which they need. On July 1, 1959, the carryover will probably be 1,239 million bushels, of which the government will own a very high percentage and of which a very high percentage will be not usable for the production of flour for commercial bakers. Year after year, and this is becoming progressively worse, we produce more wheat and a very high percentage of this production is not desirable from the standpoint of the commercial production of bread. As a result, we have too much total wheat, but not enough of the right kind of wheat. The only answer to this problem is plant recommended, strong gluten varieties of wheat.

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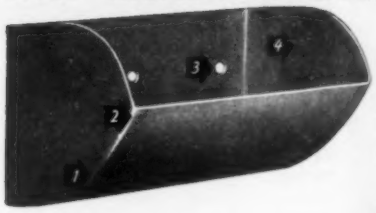

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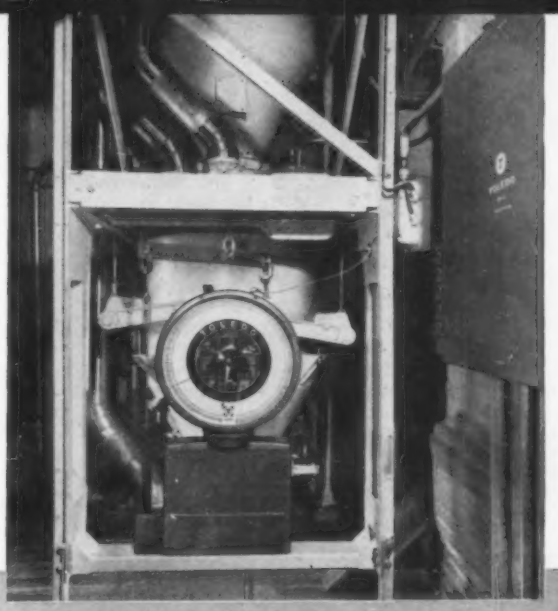

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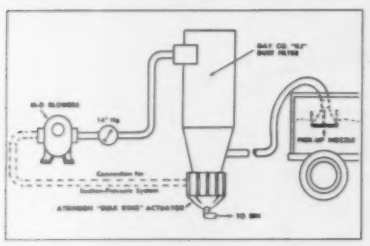
A method of handling all types of dry and granular materials by vacuum has been developed using M-D 3-Lobe rotary positive blowers, manufactured by M-D Blowers, Inc., a subsidiary of Miehle-Gross-Dexter,



Inc. The firm reported that Atkinson Milling Co., Minneapolis, unloads wheat from standard over-the-road trucks using vacuum provided by Miehle-Dexter rotary positive blowers at the rate of 1,200 bu. or 72,000 lb./hr. This flow rate enables one operator using a specially designed vacuum pick-up nozzle to unload a full 40-ft. trailer in 35 min., the firm said. The air-laden wheat is drawn through a filter and then dropped in a rotary air-lock feeder where it is then conveyed to the storage bin. For more information check No. 2063 on the coupon and mail it to this publication.

No. 2066—Bulk Weighing Scale

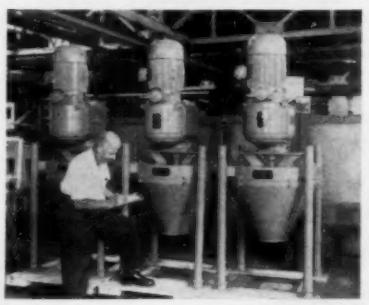
The Richardson Model MSM scale for bulk weighing of dry and free-flowing as well as sluggish materials is described in a new product data sheet offered by the Richardson Scale Co. The two-color sheet explains how the scale weighs and records mechanically the weights of materials ranging from light hulls to heavy ores. The text describes this gravity-fed machine which employs an agitator for sluggish materials, and offers dust-proof scale and counter. A photograph, drawings and specifications of the unit are included. For more information check No. 2066 on coupon.

No. 2064—Dry Fluid Drives

A new, expanded line of Flexidyne dry fluid drives and couplings is described in a 24-page bulletin by the Dodge Manufacturing Corp. The bulletin contains photographs and drawings and explains how the drives and couplings are used to solve difficult drive problems. The new line includes 10 stock couplings and eight stock drives ranging from fractional to 1,000 horsepower. Operating advantages reported in the bulletin include use of smaller motors, protection of motors from overload damage, low current draw at start, smoother running starts and absence of slip at normal running speeds. For a copy of the bulletin check No. 2064 on the coupon.

No. 2065—New Impact Mill

A new model centrifugal impact mill, particularly suited for pilot plant use, has been designed and is now being manufactured by the Entoleter Division, Safety Industries, Inc. The new direct drive mill has a 27 in. rotor and can be equipped with either constant speed or variidrive motors. This enables the mill



to be operated at any predetermined impact velocity up to 25,000 ft. per minute, and permits in-plant selection of the optimum impact speed for controlled particle size reduction of fine blending of any free-flowing materials such as chemicals, feeds, ores or plastics, the firm reported. The new unit, which is compactly designed, is adaptable to either batch or continuous flow systems and has a throughout capacity of over 10 tons hr. with cost saving, low horsepower requirements, the firm said. When required, rotors and impactors can be supplied in a wide range or corrosion and abrasion-resistant alloys to provide continuous and economical service. For more information check No. 2065 on the coupon.

No. 2068—Automatic Typewriter Readout

Automatic control of a typewritten record of weights of individual ingredients as well as batch weights is now offered by the Richardson Scale Co. for use with its "Select-O-Weigh" proportioning systems. Other related information such as time, date, batch number, etc., can also be

recorded automatically by this new typewriter readout, company officials reported. A special feature added to the typewriter is a new "column verifier." This is a printed circuit attached to the typewriter carriage which operates through a checking circuit to insure that the data being typed out is recorded in the correct columns. In addition to standard typewriter features, all keys on this Richardson readout are solenoid operated (D.C.). Maximum typing speed is 11 characters per second, and carriage length is available up to 27¼ inches. A special interlock switch regulates typing sequence and speed. For more information check No. 2068 on the coupon.

No. 2067—New Coating

A new type of moisture and corrosion resistant coating has been developed by the Glidden Co. Called Duranite, the new coating is reported extremely tough, non-toxic, and to have superior adhesive properties. It is easy to apply and provides a slick film with excellent protection against abrasion, flaking and chip-

Send me information on the items marked:

☐ No. 2063—Handling	☐ No. 2071—Check Analysis
☐ No. 2064—Fluid Drives	☐ No. 2072—Bulletin
☐ No. 2065—Impact Mill	☐ No. 2073—Sifter
☐ No. 2066—Scale	☐ No. 2074—Marking Device
☐ No. 2067—Coating	☐ No. 2075—Belting
☐ No. 2068—Readout	☐ No. 4218—Measuring Device
☐ No. 2069—Belt Splicing	☐ No. 7208—Booklet
☐ No. 2070—Conveyor	☐ No. 7228—Truck Service

Others (list numbers) .....

NAME .....

COMPANY .....

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CLIP OUT—FOLD OVER ON THIS LINE—FASTEN (STAPLE, TAPE, GLUE)—MAIL

FIRST CLASS PERMIT No. 2 (Sec. 34.9, P. L. & R.) MINNEAPOLIS, MINN.

BUSINESS REPLY ENVELOPE
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POSTAGE WILL BE PAID BY—

The Northwestern Miller

P. O. Box 67

Reader Service Dept. Minneapolis 40, Minn.

HUSTLER

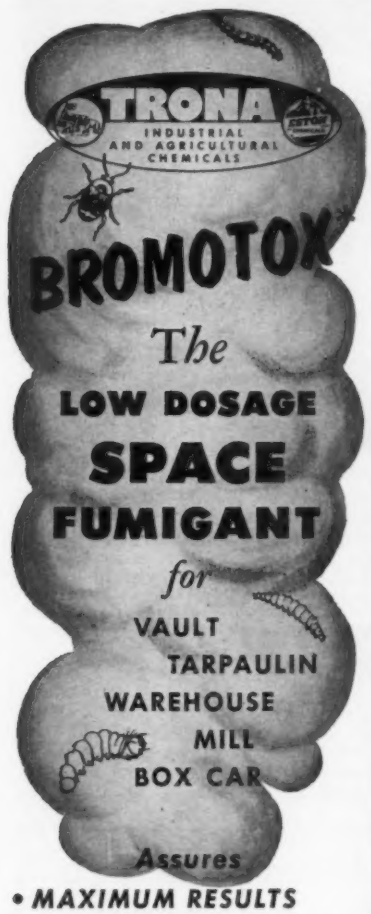
NEW FLOOR MOUNTED HUSTLER SIFTERS

TWO SECTION SIFTERS

A compact, sturdy sifter using standard type sieves for easy quick change of flow. Steel box is strong and sanitary unit type base with individual motor drive.

Special size of sifters can be designed to meet your requirements. We do custom work on all types of machines and can give you prompt and accurate plans and designs for new, rebuilt or repairs.

N NOR-VELL INC.
FORT SCOTT, KANSAS
The Name That Means Better Sifting



- MAXIMUM RESULTS
- GREATER SAFETY
- MORE ECONOMY

Bromotox, a mixture of ethylene dibromide and methyl bromide, is an effective, safe and economical space fumigant. The stronger odor and lower dosage requirements of Bromotox result in greater killing power, increased economy and maximum safety. It is longer lasting, more penetrating and leaves no residual odor. Bromotox allows positive control of granary and rice weevils, Angoumois grain moth, confused flour beetle, Mediterranean flour moth, raisin moth, cheese mites and many other pests infesting grain, flour, rice, cheese and dried fruits. Available in cans packed twelve per case as well as 10, 50, 120 and 170 pound cylinders.

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Other Eston Fumigants:

ESTON METHYL BROMIDE
The Versatile Fumigant

M-B-C FUMIGANT
Methyl Bromide with 2% Chloropicrin

A Product of
ESTON CHEMICAL DIVISION

American Potash & Chemical Corporation

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Midwestern Distributor

FERGUSON FUMIGANTS

P. O. BOX 5868
FERGUSON 21, MISSOURI

ping. Now commercially available after more than two years of service as a protective liner for the interiors of GACX airslide, "R," railroad hopper cars, Duranite is also applicable as an interior lining for flour bins, grain elevators, bulk food storage tanks and grain bins. The new lining system may be applied to metal, wood or cement. Bins constructed of wood require three coats while two coats are generally sufficient to insure good protection on other surfaces. Areas to be coated should be sandblasted to remove foreign matter, and the final film of coating should be five to six mils on steel or cement and six to seven mils on wood. For more information check No. 2067 on the coupon.

No. 2069—Belt Splicing

A new high speed splicing procedure for its Type LT belting has been announced by Extremultus, Inc. This new development permits power transmission belting to be spliced and back in operation in less than one hour, the firm said. The new splicing technique and the equipment used to do the job have been tested for more than two years and the company announces it results in a perfectly smooth joint of unprecedented flexibility and strength. Previous splicing methods used on Extremultus belting required from eight to 10 hours. For more information check No. 2069 on the coupon.

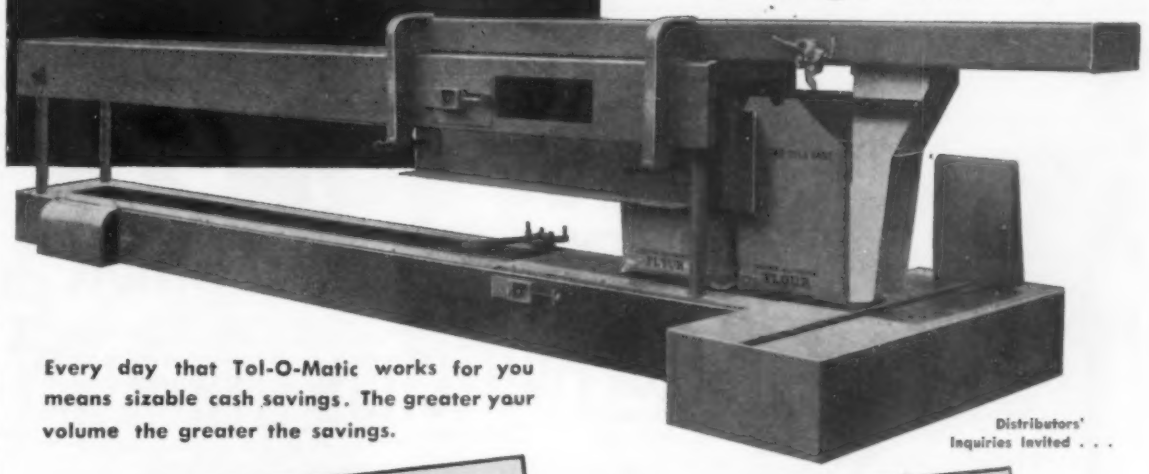
No. 2070—Portable Pneumatic Conveyor

Development of a trailer mounted, portable, combination positive and negative pressure pneumatic handling system has been announced by Sprout, Waldron & Co., Inc. Here are

How To Save 100% OR MORE On Sealing BALES

THIS IS THE
Tol-O-Matic
AUTOMATIC
BALE SEALER
FOR SEALING PAPER BAGS

. . . and here is how and why you can make such tremendous savings with it!



Every day that Tol-O-Matic works for you means sizable cash savings. The greater your volume the greater the savings.

Distributors' Inquiries Invited . . .

LABOR SAVING

100% OR MORE OVER HAND-SEALING METHODS. WHERE NORMAL 2 TO 4 MAN CREW IS USED, PACKAGING OPERATION IS CUT TO 1 MAN.

AVERAGE MINIMUM ANNUAL LABOR SAVINGS $5,200.00

MATERIAL SAVINGS

TAPE SAVINGS OVER 98%. GLUE COSTS LESS THAN 2% OF SEALING TAPE. EXAMPLE: PLANTS WITH OUTPUT OF 2,400 AVERAGE SIZE BALES PER 8 HOUR DAY CAN

SAVE EACH DAY IN MATERIAL ALONE $18.00 OR ANNUAL SAVINGS OF $5,616.00

NOTE: The Tol-O-Matic will seal up to 12 average size bales per minute or 5,760 per 8 hour day.

MINIMUM SAVINGS (COMPUTED ON 2,400 BALES IN AN 8 HOUR DAY WEEK) AMOUNT TO $10,816.00 PER YEAR

Tol-O-Matic, Inc.
246 Tenth Avenue South • Minneapolis 15, Minnesota

wash wheat?

ELIMINATE WATER PROBLEMS with an IPI RECOVERY SYSTEM

If you now have an inadequate, or high-cost water supply, an IPI Recovery System will eliminate your problem. Your city water requirements can be reduced by as much as 90%.

ADDS EXTRA PROFITS... REDUCES SEWAGE

As it solves your water problems, an IPI Recovery System also adds to your plant profits (by recovering wheat-washer solids)—and reduces total sewage by as much as 90%. Now in *successful* operation, the IPI Recovery System has proved its worth. Complete details are available from—

IPI Industrial Processes, Inc.
621 S. W. MORRISON • PORTLAND 5, OREGON

the major advantages claimed: 1. Complete portability. The assembly is mounted on a four wheel trailer and is designed for complete maneuverability. 2. The over all height of the system is several inches less than 8 ft., making it practical for use in almost any type plant. 3. In spite of compact size, the unit includes a 14 x 10 rotary vane airlock feeder which insures large capacity on most types of free-flowing material. 4. The design includes an in-line filter with easily removable filter bag. The capacity of the unit depends entirely on the nature and weight of the material being handled and the combined vertical and horizontal travel distance. The initial application for which this portable Pneu-Pac was designed involved collecting granular plastic cubes, measuring approximately ⅛ in. to ¼ in. ring size at the rate of 10,000 lb./hr. For more information check No. 2070 on the coupon.

No. 2072—Bulletin On Conveying

A new 16-page illustrated bulletin points out how pneumatic conveying systems can reduce plant operating costs and improve plant efficiency. Issued by the Day Co., this bulletin covers high density (fluidizing type) and low density conveying systems and equipment. Common installation

arrangements are diagrammed. Photos show actual installations, basic equipment and accessories. Bulletin briefly describes Day research, testing, engineering, fabricating and installation services. To obtain a copy check No. 2072 on the coupon.

No. 2071—Check Analysis Service

Availability of a free check analysis service for the grain and feed industry primarily to help its members redesign their checks for electronic bank bookkeeping has been

JONES-HETTELSATER CONSTRUCTION CO.
Designers and Builders for Milling Companies
1911 Baltimore Ave. KANSAS CITY 6, MISSOURI

HANDY SHOT CANS

Just Punch Hole in Can and Pour into Parts

The most economical, effective, low dosage, pre measured, pre-packaged spot fumigant. Pre-packed in cans 2 inches high, 2 inches wide. Small package means greater safety. Eliminates hazard of hand filling, of glass bottles, of dangerous bucket and dipper application. One little can carries an insect knock-out punch of up to a quart of high dosage fumigant. Gives you safety, economy, results. Shot cans, combined with good housekeeping practices and residual insecticide applications, will give practical freedom from insect infestation without general fumigation.

DAWSON® 73 *
PREVENTS MILL INFESTATION
PERFECT PROTECTION EITHER WAY

FERGUSON FUMIGANTS, INC., A TRAINED EXPERIENCED SERVICE ORGANIZATION.

Ferguson Fumigants, Inc. is the original developer of Dawson 73 low dosage spot fumigant (U.S. Patent 2,606,857) and "Little Squirt" applicator equipment. We make it our business to see that you get maximum results at minimum costs. A large percentage of the flour milling capacity of the United States regularly use Dawson 73 preventive insect control system. Ask the man who is using it. Mail the coupon below and let us call on you and give you all the detailed information without obligation, of course.

* U.S. PATENT No. 2,606,857

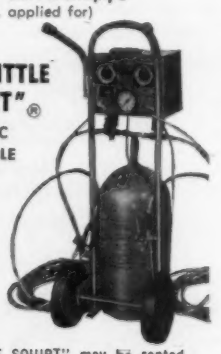
FOR MORE DETAILED INFORMATION, CLIP THIS COUPON AND MAIL ON YOUR LETTERHEAD TO:

DAWSON LOW-DOSAGE FUMIGANTS

FERGUSON FUMIGANTS INCORPORATED
P. O. Box 5868, Ferguson 21, Mo.

ELECTRIC "SQUIRT" BOX®
For Use With Standpipe
(Pat. applied for)

"THE LITTLE SQUIRT"®
ELECTRIC PORTABLE
(Patent applied for)

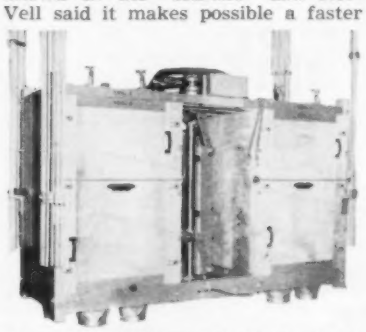


Either "LITTLE SQUIRT" may be rented, including continuous maintenance and repair, at nominal fee without capital investment, and with continuous service involving regularly scheduled visits to the mill by Ferguson Fumigants technician to assist in attaining maximum results at minimum cost. Regular insect population counts and other assistance in your effective sanitation program are available without charge on request. Two men in two hours completely spot fumigate average 4000 cwt. capacity mill with minimum shut-down and minimum exposure period. Regularly scheduled spot fumigations with Dawson 73 prevent insect infestation and keep the insect count at a near zero point continually.

announced by the Todd Company Division, Burroughs Corp. The service will be provided by the firm's new check analysis and design department, created to assist banks and commercial firms in redesigning their checks to meet the needs of the new electronic bookkeeping equipment already installed in hundreds of banks across the country and on order by hundreds more. In addition to rating a check on its adaptability to electronic processing, the analysis chart to be forwarded by the department will also appraise it on 12 other points, including general efficiency, arrangement for accurate bank handling, advertising and public relations values, color, typography, general layout and safeguards provided against alteration and forgery. For more information check No. 2071 on the coupon.

No. 2073—New Model Sifter

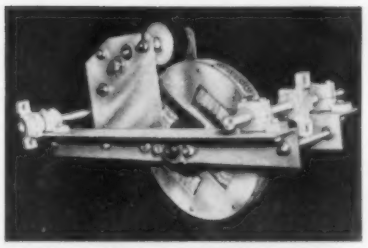
Nor-Vell, Inc., has announced a new model bulk flour sifter which it says is capable of handling up to 1,000 bags/hr. to accelerate plant-to-trailer loading capacity. The new sifter is known as the "Hustler" and Nor-Vell said it makes possible a faster



flow of bulk flour and at the same time accomplishes the resifting operation which is mandatory in transferring in-storage flour to the consumer. The Hustler incorporates a three-bearing anti-friction drive sifter and has extra large sifter box channels, Nor-Vell said, to make possible the 1,000 bag/hr. rate of delivery. For further information check No. 2073 on the coupon.

No. 2074—Marking Device for Bags

Kiwi Coders Corp. announces that it has available a new heavy duty code dater for marking 50 lb. and 100 lb. filled multiwall bags on the top, bottom or side. The device is built-in on bands, changing the code in use to another by turning small wheels rather than manipulating loose type which sometimes is lost. Kiwi also manufactures a power



driven machine for imprinting multiwall bags in the flat with any kind of printing required. For further information, mark No. 2074 on the coupon and mail to this publication.

No. 7208—Storage Structure Booklet

An eight-page illustrated booklet on storage structures and related materials handling equipment is available from Sprout, Waldron & Co., Inc. Called Bulletin 207, the booklet contains dimensional and capacity data on a wide range of storage equipment including glass and epoxy lined tanks — square, round, vertical and horizontal units. For further details check No. 7208 on the coupon and mail it to this publication.

REMEMBER TO ORDER
CHASE BAGS
There's None Better!

For Mills, we recommend . . .
Talismanic
BELT DRESSINGS
Specialized for Your Industry
Belt Clinch No. 2 (liquid) and Bar Belt Dressing No. 3.
These dressings are preferred by 75% of our flour mill customers.
WRITE FOR GENEROUS SAMPLES
JOHN C. CHAMBERS CO.
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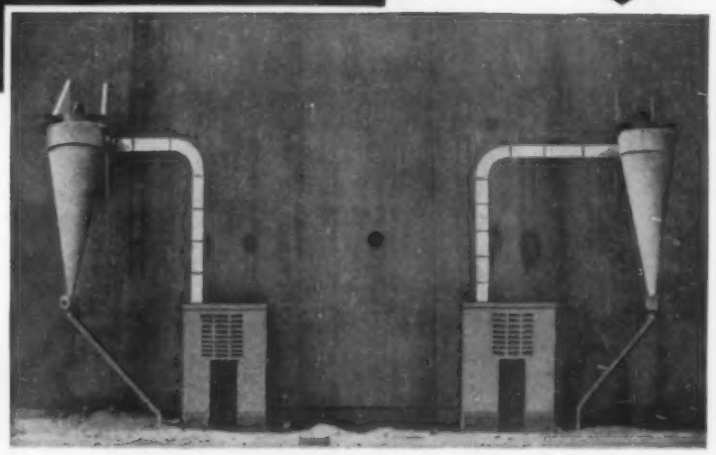
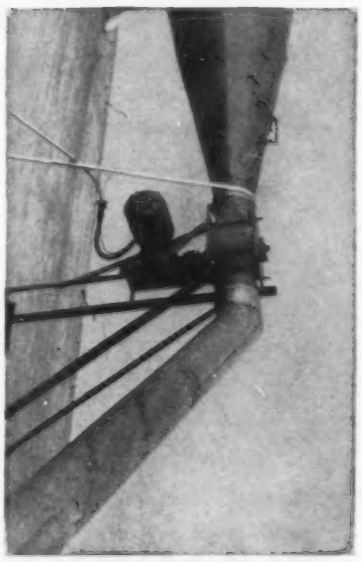
Chicago 39, Ill.

HOW TO CONTROL DUST THE NEW, LOW-COST WAY

One of the World's Largest Grain Elevators—C-G Grain Co. 20-million bushel house near Wichita, Kansas—equipped with the Forster "FORNADO" Dust Control twin installation pictured below. A 450-foot dust-free tunnel.



It's the New
FORSTER FORNADO Dust Control SYSTEM
top efficiency at lower operating cost



The Forster AIR-LOCK IS ONE reason for high efficiency of the Forster "FORNADO" dust system. Installation pictured above returns recovered material from receiving unit to stock, still keeping a positive air seal on this highly efficient dust control system.

AT LAST! Here's a dust control system that is simple and efficient with all operating savings from modern engineering and design. It is the new Forster FORNADO, an integrated pneumatic system that fits both large and small plants.

When you see it, you will recognize at once that FORNADO is miles ahead of the field because it is so compact. The unit consists of a skillfully designed collector, a high static precision fan connected directly to the motor and an efficient airlock.

The secret of its success is the carefully balanced capacities of each part of the unit. And the secret of its lower cost is simple installation, big power savings and easy maintenance. FORNADO has been tested and proved in installations like that in the big C-G grain elevator pictured above.

It's easy to modernize your present system and get the extra efficiency and low operating costs of top-rated FORNADO. Let Forster engineers analyze your problem without cost to you.

The FORSTER MFG. CO.
Ada, Oklahoma
Machines for Modern Milling
At Your Service . . . We Fly Our Own Planes

No. 2075—Special Belting

Imperial Belting Co. has announced that it has a conveyor belt designed specifically to handle flour as part of its complete line of special belting. Imperial Sanital, the firm said, is a clean, white, sanitary belting that will not affect the flavor or appearance of foodstuffs handled. Waterproof, it can be washed when necessary for cleanliness. Sanital is recommended for breaker leg service in flour and cereal mills, for handling wet or dry cereals and similar food products. Other brands in this complete line include Black Rexall for highspeed grain and marine leg service and new Rexall bag conveyor belting. Special heavy-duty duck base fabric, double-stitching and impregnating compounds are features of all these belts which are designed for extra-long service life. For complete information check No. 2075 on the coupon.

No. 4218—Electronic Measuring Device

A new electronic temperature measuring device designed as both a portable and bench model has been

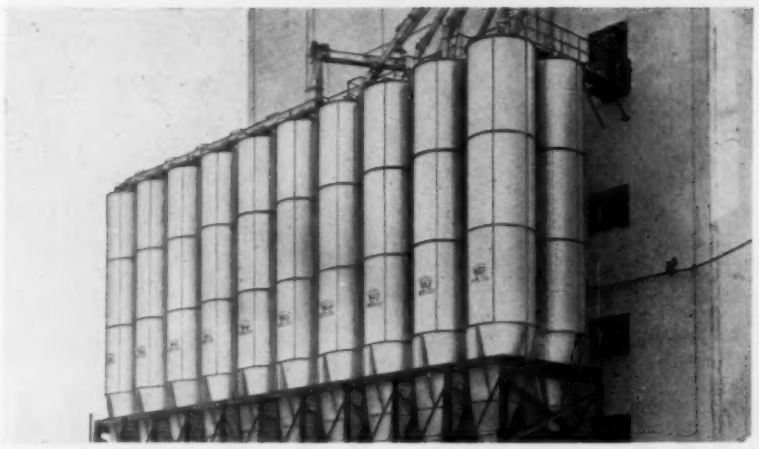
made available by the electronics division of Motomco, Inc. The instrument, called the Model 953 Temperature Indicator, provides instant and accurate temperature readings between 10° F. and 200° F. and is battery operated. The sensing element is in the tip of the pencil-like probe which is so designed that it can measure temperature in granular products both "on stream" and in the laboratory. For details, check No. 4218 and mail to this publication.

No. 7228—Used Lift Truck Service

A facility for dealing in used fork lift trucks on a national scale has been established by the Clark Equipment Co. Called the Used Equipment Center, the facility will buy, sell or trade used fork trucks of any type or make. The center will be operated along the lines of a used car lot, the company says. For more details, check No. 7228 on the coupon and mail to this publication.

DAY

BULK STORAGE NEWS



A battery of 20 DAY vertical bulk storage tanks serving packaging line as well as truck and rail car loading operation. Each tank section holds approximately a carload of ingredients.

DAY BULK STORAGE TANKS

No other method stores bulk materials at lower cost

SAVINGS is one of the big advantages of DAY bulk storage and material handling equipment. Typical reports from DAY bulk tank owners tell of savings from 25¢ to 35¢ per hundred pounds of material handled. With DAY tanks, you save container or bag costs, you save labor, you save storage space and you save "invisible loss" because there's no spillage or breakage. DAY tanks improve plant efficiency and keep costs down.

For the most complete line of economical bulk tanks in vertical and horizontal styles, turn toDAY, now. Increase your plant's operating efficiency, lower material handling costs, improve sanitation and housekeeping with DAY bulk tanks. Free bulletin tells how to handle bulk material at lower cost with DAY units. Write toDAY for Bulletin 574.

The DAY Company

SOLD in UNITED STATES by The DAY SALES Company 822 Third Ave. N.E., Minneapolis 13, Minn.

MADE and SOLD in CANADA by The DAY Company of Canada Limited P. O. Box 70E, Fort William, Ontario

Representatives in Principal Cities

EQUIPMENT ONLY OR A COMPLETE SYSTEM

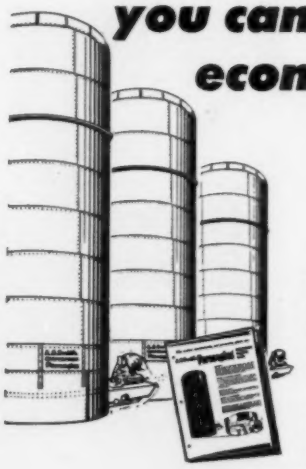
If you handle or store any difficult bulk materials ...

FLAKY
PULVERIZED
GRANULAR
EDIBLE
NON-EDIBLE
CONTAMINABLE
HYGROSCOPIC

you can do it more economically

with A. O. Smith Permaglas®

MECHANIZED STORAGE UNITS



You'll be money ahead if you can eliminate bags, boxes, barrels, hand and fork trucks. Modern Permaglas mechanized bulk storage units actually turn storage into a profitable production tool. Want more facts? Call, write or wire soon for free Permaglas Bulletin.

GLASSLINED Bulk Storage, Inc.

901 Excelsior Avenue West
Hopkins, Minnesota
Phone WEst 5-1555

ADM Department Will Represent Strong-Scott

The equipment department of Archer-Daniels-Midland Co. has been appointed sales representative for the Strong-Scott Mfg. Co. of Minneapolis, in the central and southern states. This was announced in a joint statement by R. R. Strong, executive vice president of Strong-Scott and Richard G. Brierley, ADM vice president.

Strong-Scott manufactures a complete line of mixing, grinding, separating and materials handling equipment for grain elevators, feed mills and processing plants. The equipment department will handle the sale of Strong-Scott equipment in Nebraska, Kansas, Colorado, Oklahoma, Texas, Arkansas, Louisiana, Missouri and Mississippi.

The equipment department, with headquarters in Kansas City, is under the direction of Frank D. Allen, sales manager. Mr. Allen has been associated with the grain and feed mill equipment industry for many years. He will be assisted by Dean Scholes, sales engineer. Mr. Scholes previously was a sales representative for Strong-Scott. Prior to this association, he was a vice president of Agri-Tech, Inc., of Kansas City.

The equipment department maintains a staff of engineers for design and layout service to its customers. This will be under the direction of Amos O. Russell. He was formerly with the engineering department of Columbian Steel Tank Co., where he designed feed mills and grain storage equipment. He is a former plant manager and assistant production manager for Cerophyl Laboratories, Lawrence, Kansas, and a former chief draftsman for the Farm Credit Administration in Washington.

—BREAD IS THE STAFF OF LIFE—

Stone Detector Distributor Named

The Andersons of Maumee, Ohio, recently appointed Seedburo Equipment Co. of Chicago, the exclusive distributor of "Stone Sleuth," a protection system for detecting rocks and tramp iron in corn shellers. This unit is the result of three years of development by the Andersons who are well known to the grain trades. It has had actual test-use by the Andersons as well as many other grain elevator operators.

The "Stone Sleuth" is an electronic device which listens for noises that are different from ordinary shelling. A contact-type microphone placed on the shelling drum feeds signals into an amplifier. Should the signals become more intense than the ordinary level as pre-set by the operator, the amplifier actuates a switch stopping the sheller motor immediately.

This device has virtually eliminated breakdowns and damage due to rocks and other foreign objects, the Andersons claim. The unit carries a guarantee of one year free parts and is sold on a 30-day free trial basis.

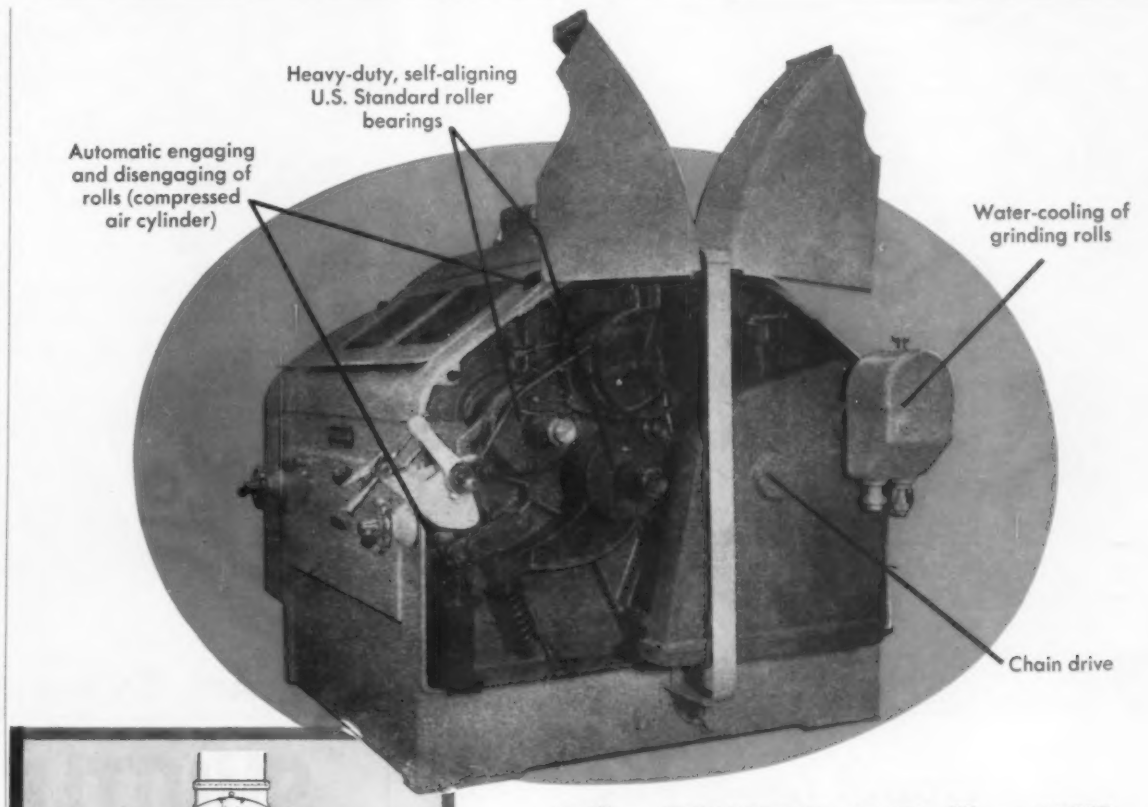
CHECKERBOARD GRAIN COMPANY
MILLING WHEAT • COARSE GRAINS • MILLFEED
Hard and Soft Winter Wheat
CHICAGO • ST. LOUIS • KANSAS CITY • MINNEAPOLIS

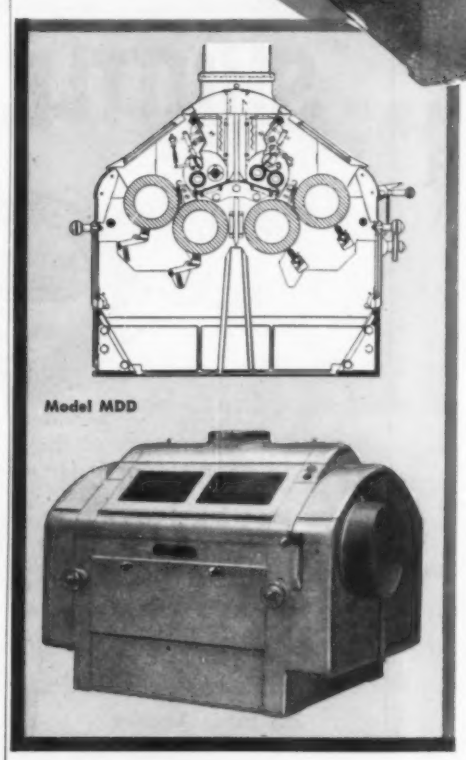
★ Buy and Sell Through WANT ADS ★

PAPER SACKS FOR MILLERS
The Chatfield & Woods Sack Co.
CINCINNATI, O.

LET DOTY DO IT
If Your Lab Is Overloaded
Sanitation Analyses - Wheat and Flour
Doty Technical Laboratories
P. O. Box 7474
North Kansas City 16, Mo.

ROLL GRINDING and CORRUGATING
Also NEW ROLLS for Sale
TWIN CITY MACHINE CO.
Minneapolis, Minn.


Heavy-duty, self-aligning U.S. Standard roller bearings
Automatic engaging and disengaging of rolls (compressed air cylinder)
Water-cooling of grinding rolls
Chain drive


Model MDD

Why BUHLER 4-Roller Mills help reduce production costs

More than 70,000 BUHLER-*Built* Roller Mills are in operation throughout the world. *That's more than any other make.* Here are some of the reasons:

Better Milling Results . . . are obtained through uniform grinding due to even and fully automatic feed, highest quality rolls, and precision adjustments.

Less Power Needed . . . Self-aligning roller bearings permit higher operating speeds and higher output, yet need up to 20% less power than conventional sleeve bearings.

Takes Less Floor Space . . . For example, the compact, streamlined 10" x 40" BUHLER occupies same space as conventional 9" x 36" mill. You get 10% more grinding surface from same floor space.

Highest Degree of Sanitation . . . New BUHLER design provides no dead corners in which insects may breed.

Low Maintenance Costs . . . due to sturdy design, high quality materials, and highest standards of workmanship.

OPTIONAL FEATURES

Automatic engaging and disengaging of grinding rolls to prevent damage when running empty.

Chain instead of gear drive.

Water cooling to keep product cool. Greater uniformity, better control of moisture loss, easier sifting.

4-speed regulator for feed rolls.

BUHLER
Serving the Flour Milling Industry since 1860

For more information on how BUHLER Engineers, BUHLER Experience, BUHLER Equipment can help you increase the efficiency of your mill, call or write . . .

Buhler Mill Engineering Co.
4207 Nicollet Ave., Minneapolis 9, Minn.

Sprout, Waldron & Co., Inc.
12 Logan Street, Muncy, Pennsylvania

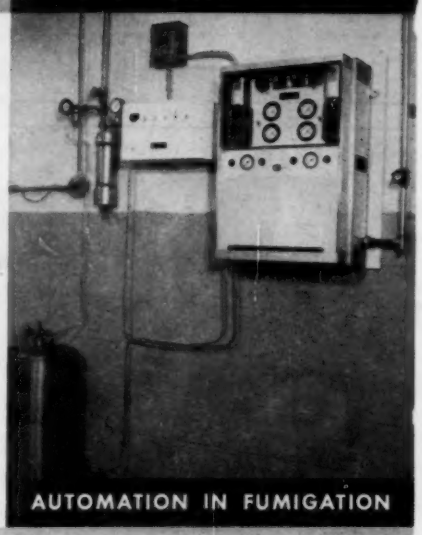
Buhler Brothers, (Canada), Ltd.
24 King Street West, Toronto 1, Ontario

NOW! 100% LABOR SAVINGS! WITH THE ARROWCIDE Mark IV INSECT CONTROL SYSTEM

- SAVES 75% ON FUMIGANT!
- REDUCES GENERAL FUMIGATIONS!
- GIVES POSITIVE CONTROL!
- ELIMINATES APPLICATION HAZARDS!
- TIME-TESTED AND PROVEN!

Arrowcide Mark IV is an automatic permanently-installed insect control system centrally located and operated. Standard-formulation "spot" fumigants are vaporized and injected into the interior of processing-storage-packing equipment. Low-cost, positive control of infestation is obtained by simply pushing a starting-button.

The Arrowcide "Falcon", a smaller unit, is available where less capacity is required. Write TODAY for detailed information.



AUTOMATION IN FUMIGATION

ARROWCIDE DIVISION
STAINLESS PRODUCTS CORPORATION
BELDING, MICHIGAN

Technology Laboratory For Macaroni Industry Established in Chicago

A miniature continuous macaroni press and automatically controlled dryer are some of the special equipment in the recently established food technology laboratory of the Glenn G. Hoskins Co., Chicago. The laboratory has been established to serve primarily the needs of the macaroni-noodle industry and will be equipped to perform research and analytical tests. In addition, the 40 lb. per hour continuous, vacuumized press and automatically controlled dryer will provide what the firm believes is the only complete macaroni pilot plant operation in the U.S.

The company is a firm of industrial consultants specializing in the macaroni - noodle industry. Established for 18 years, the Hoskins company has provided management and technical help to the industry in the fields of new plant design, process control, bulk flour handling design, drying and new machinery development.

"The new laboratory," according to W. G. Hoskins, "is something we have needed for a long time to round out our technical consulting service to the macaroni industry. We have felt the need, in our business, to do more of the testing and basic research work which we know is necessary to give more adequate control of quality and to improve the products of our industry."

The aims of the laboratory program will be to promote a higher quality level and to increase general knowledge of both raw and finished products. Mr. Hoskins hopes to do basic research, develop new products, attempt to solve production and processing problems and to improve drying and dryer control.

The quality control tests which the laboratory will be able to perform will include protein, ash, moisture, color, particle size, diastatic power, microscopic examination for extraneous matter, vitamin assay, tests of whole eggs and egg yolks to determine solids and color, sodium chloride, bacteria and choliform count. The laboratory will also be equipped to test noodle samples for egg solids content and any other standard laboratory test.

For self-rising meals and flours...
For <u>every</u> processing need...

Treated free-flowing

Bicarbonate of Soda

(U.S.P. BICARBONATE OF SODA WITH TRI-CALCIUM PHOSPHATE ADDED)

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EVERY household knows the famous "Arm & Hammer" and "Cow Brand" Baking Soda. And most millers know that Church & Dwight treated free-flowing soda is produced with the same care and under the same rigid controls to make it the finest product available.

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Mr. Gene Lane, Utility Operator, at the Central Soya Co., Inc., Chattanooga, Tenn. plant, operates 36 Merchen Scale Feeders that blend feed ingredients to 1% accuracy.

MERCHEN SCALE FEEDERS

"give us accurate, continuous blending over a wide feed range"

Central Soya Co., Inc., blends millions of bags of animal and poultry feed a year at their new Chattanooga plant. Up to 50 different formula feeds are produced to exacting standards. Central Soya chose W&T Merchen Feeders because they give 1% minute-to-minute accuracy over a wide feed range. As seen in the picture, the feeders are compact—with no bulky enclosures.

Merchen Scale Feeders, with feed rates from 3 to 3000 pounds per minute, require no adjustment for changes in material density. They are suited for most industrial continuous blending or automatic batching processes. For more information about Merchen Scale Feeders, write for Bulletin M-36. 57.

WALLACE & TIERNAN INCORPORATED

25 MAIN STREET, BELLEVILLE 9, NEW JERSEY

Because various grains differ in length

You can make exact separations

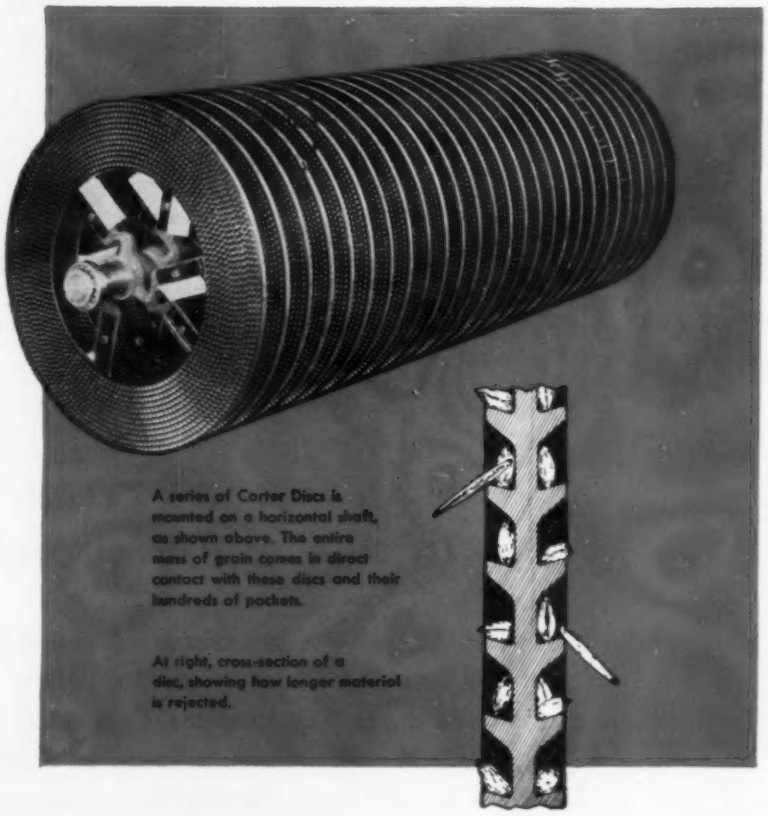
SOME GRAIN IS LONG

SOME IS MEDIUM

SOME IS SHORT

MANY grains are almost identical in width or thickness and would be difficult to separate if it were not for marked differences in their *lengths*. Oats, for example, are longer than wheat; cockle, on the other hand, is shorter than wheat. Because of these length differences, the Carter Disc Separator can make *exact* separations. By means of Carter Discs, which contain hundreds of undercut pockets, the grains or seeds are selected or rejected according to length. As the discs revolve through the grain or mixture, the pockets lift out the material they are designed to carry, and positively reject anything longer.

Take advantage of this accurate method of length separation. Install Carter Disc Separators now!



A series of Carter Discs is mounted on a horizontal shaft, as shown above. The entire mass of grain comes in direct contact with these discs and their hundreds of pockets.

At right, cross-section of a disc, showing how longer material is rejected.

CARTER DISC SEPARATOR

SC **SIMON-CARTER CO.**
673 Nineteenth Ave. N. E. • Minneapolis 18, Minn.
Successor to Hart-Carter Co., Minneapolis Division

Engineers and manufacturers of grain cleaning machinery